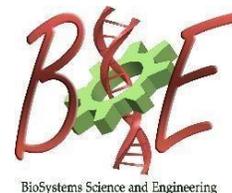**Indian Institute of Science**
Centre for BioSystems Science and Engineering
BSSE Seminar
29th April 2019, 4:00 PM, MRDG Seminar Hall, 1st floor,
Biological Sciences Building

Mechanistic Physiological Modeling in Modern Drug

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ABSTRACT:

Discovery and development of new drugs is one of the most complex and challenging problems facing us today. The field of quantitative and systems pharmacology (QSP) has developed as part of the effort to make this process more efficient, faster and cheaper. The NIH White paper on QSP (Sorger et al.) defines the goal of QSP as "to understand, in a precise, predictive manner, how drugs modulate cellular networks in space and time and how they impact human pathophysiology. It aims to develop formal mathematical and computational models that incorporate data at several temporal and spatial scales; these models will focus on interactions among multiple elements (biomolecules, cells, tissues etc.) as a means to understand and predict therapeutic and toxic effects of drugs". We present here examples of QSP models currently used in different therapeutic areas and discuss how modeling has helped in knowledge integration and decision making in each case.

In drug development, data and knowledge from multiple scales and experimental set-ups are available, as well it is an environment in which multiple high-value decisions need to be made based on this knowledge. QSP, which focuses on integrating knowledge in a quantitative framework and can provide predictive simulations, is a field whose time has come.

Biography of the speaker:

Rukmini earned her Bachelors and Masters in Physics from University of Madras and IIT Madras, and a Ph.D. in Physics from the University of Pittsburgh. She started working on Model-Based Drug Development (MBDD) during her Ph. D. Her work contributed to scientific publications as well as to the founding of Immunetrics in Pittsburgh. She has since spent more than a decade in MBDD: 7+ years working with Entelos, a pioneer company in predictive biosimulation, and a further 5+ as Principal Scientist & co-founder of Vantage Research. Rukmini leads multi-disciplinary teams in developing physiologically detailed models to simulate novel drugs and trial designs and enable better decision making in drug discovery and development. She has worked with many of the major pharmaceutical companies, including Eli Lilly, Merck, Bayer, Mitsubishi-Tanabe etc. as well as the Gates Foundation.